

20 & 180 deg Dipole

- 20 dipole design is ready for procurement – steel and field accuracy discussion
- 180 dipole will not be used as a Spectrometer Magnet for energy spread measurement:
 - 180 and 20 Dipole multipoles must be $\leq 10 \times 10^{-3}$
 - Anamesh Jain will evaluate the field quality at low field on one of the CEC 45 dipoles.
 - Review of sliding design of 180 in process: K. Hamdi produced magnet design where chamber and dipole steel move together ± 10 cm Z together.

Reminder: Al Pendzick needs new penetration required at 2:00.

This will include type (RF, instrumentation, power), location (from/to), and area of cable space. The request for this contract must be by March-April in order to have penetrations installed during this shutdown (takes 6 mo. to get jobs done - October).

LF Solenoids

- **In Contract**

HF Solenoids

- **In Contract**

Instrumentation

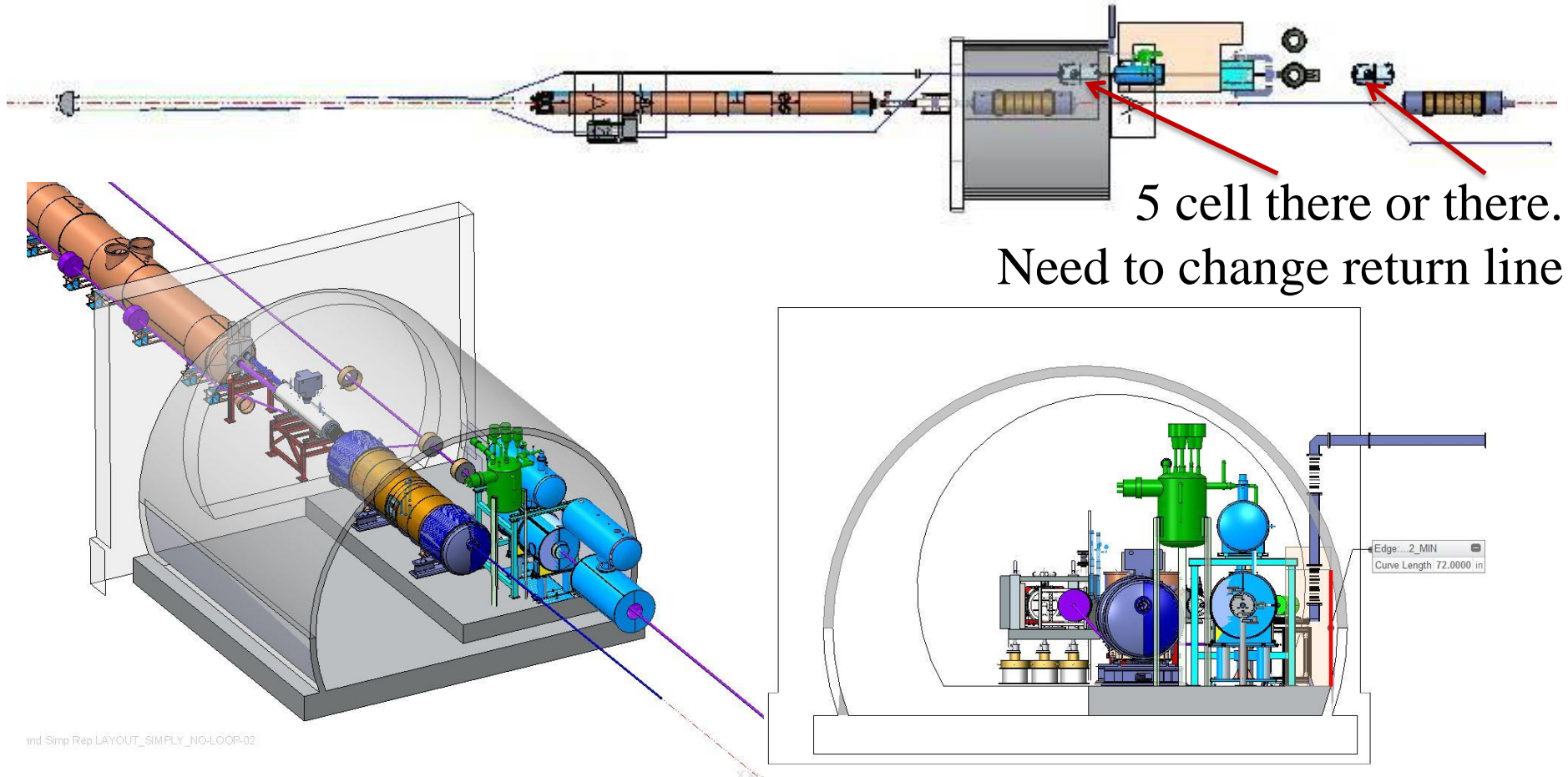
- MPF for BPM status.

Beam Line Vacuum

- The standard bellows design for cooling section has some problems bolting up to BPM – bolt can go in only one way. He prefers to not use studs.

5 cell cavity location

Location of egun and 5-cell, the beam line length and distance from IR center and tolerance, is being updated by R. Meier.



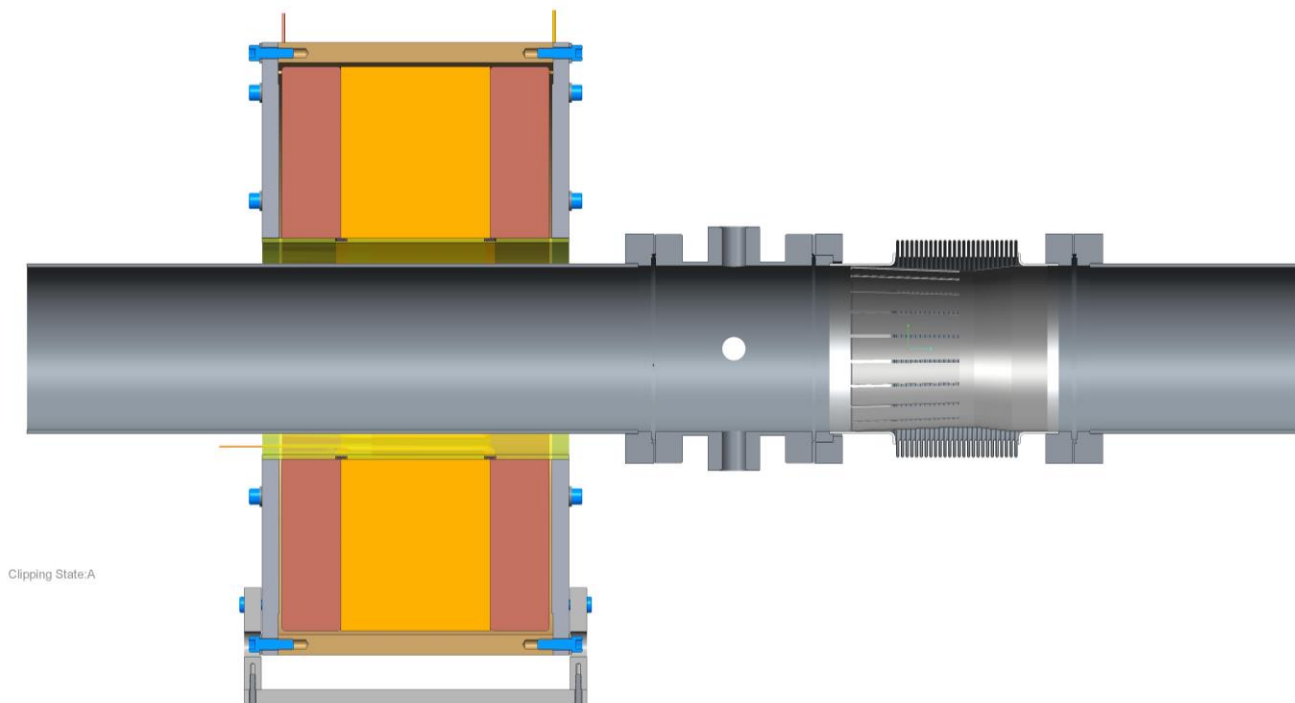
ind Simp Rep LAYOUT_SIMPLY_NO-LOOP-02

Compensating and Matching Solenoids

Contract Awarded 9/15/2015 delivery for both

Next Steps:

- Design support stand assembly
- Magnetic shielding analysis, design prototype mu metal shields and supports.
- Magnet measurement fixture plan for prototype and design test fixtures.



20° Dipole Magnet

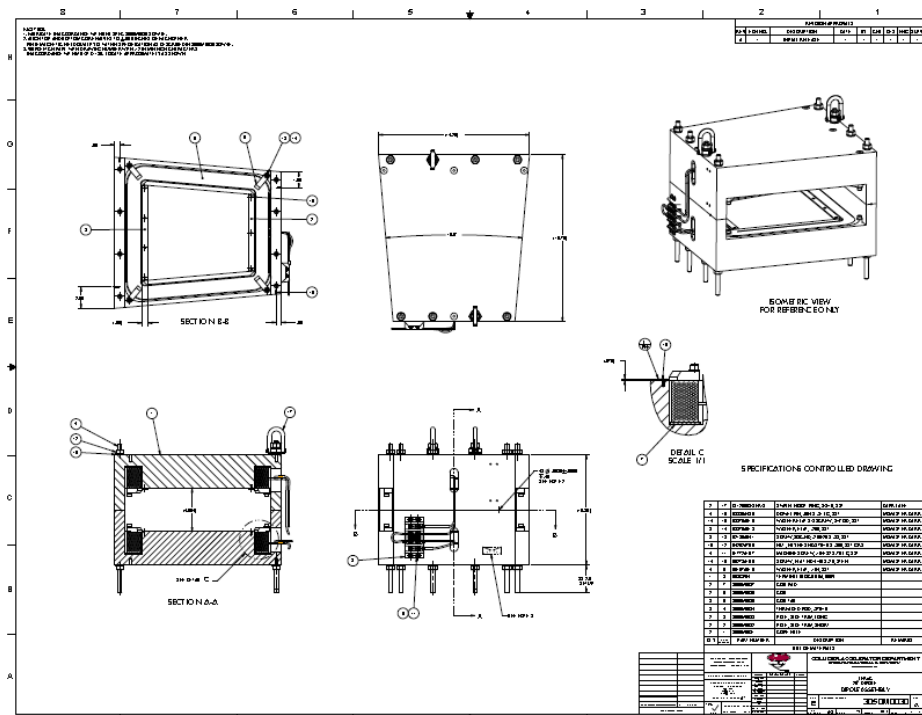
Drawings checked – preparing requisition (3/31/2015).

End field clamps: stray magnetic field? sextupole

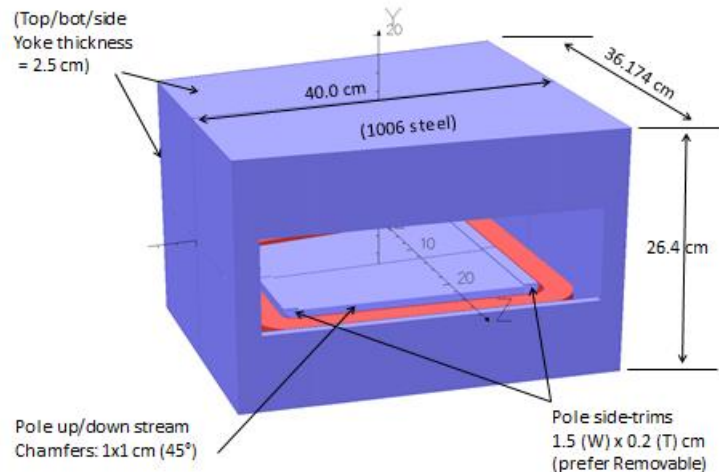
Distance Between Pole Faces = 10.4 cm (4.1 in.)

Magnet Vertical Gap = 10 cm

Vacuum Chamber V Aperture = 9.5 cm (3.74 in.)



LEReC 20-degree Dipole (Gap clearance=10 cm)
(distance between pole faces =10.4 cm)



Electron tracking results and field qualities along trajectory
on R=1 cm curved cylinder:

	Ek = 5 MeV	Ek = 1.6 MeV
Current per coil (Amp-turn)	1053.288	393.192
Overall current density (A/mm ²) (overall coil cross-section 3.0x4.8 cm)	0.73145	0.27305
Central Gap Field (Gauss)	251.20	93.73
Half b1-integral(dipole) (G-cm)	3.1982E3	1.1930E3
Half b3-integral(6-pole) (G-cm) [Ratio to dipole integral]	1.803E-2 [5.64E-6]	7.019E-3 [5.88E-6]
Half bending angle from tracking tests (required 10°)	10.013°	10.006°

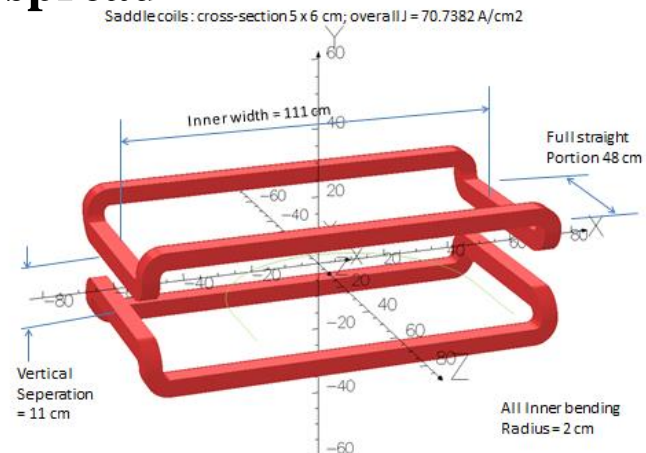
180° Dipole Magnet

Magnetic field quality and repeatability for energy spread measurement. Test using CeC dipole (A. Jain)

Range of motion for magnet core +/- 10cm.

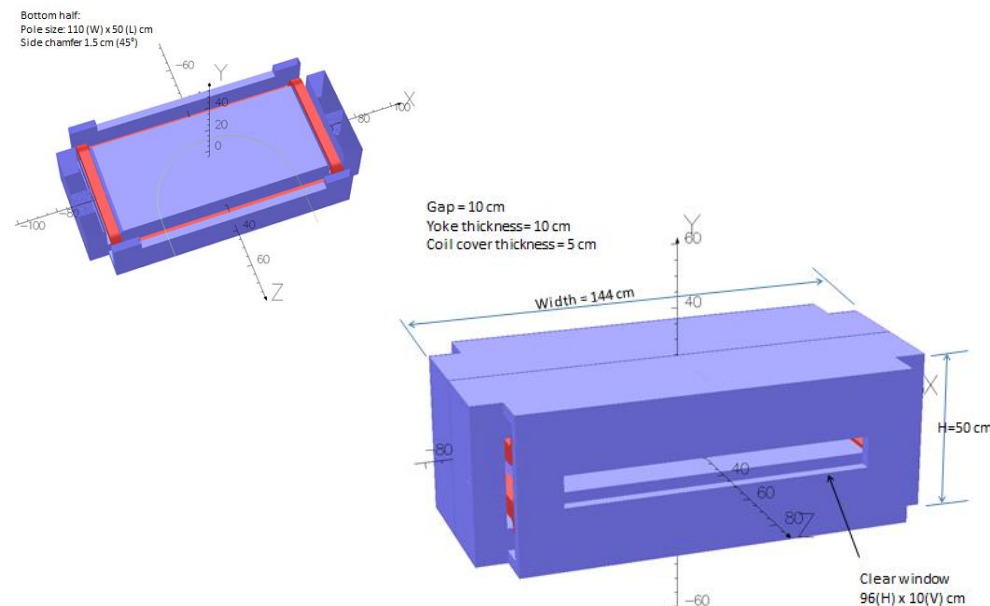
Magnet Vertical Gap = 10.0 cm (3.94 in.)

Vacuum Chamber Aperture = 9.5 cm (3.75 in.)

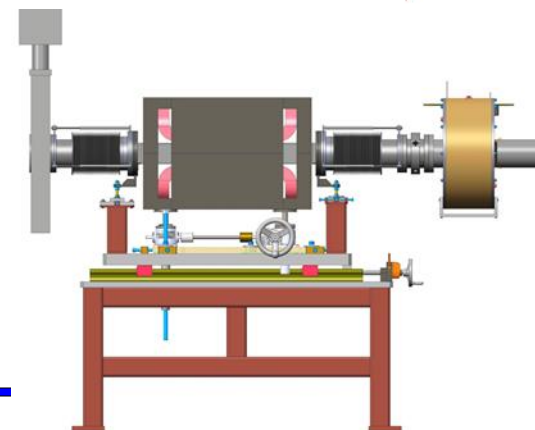
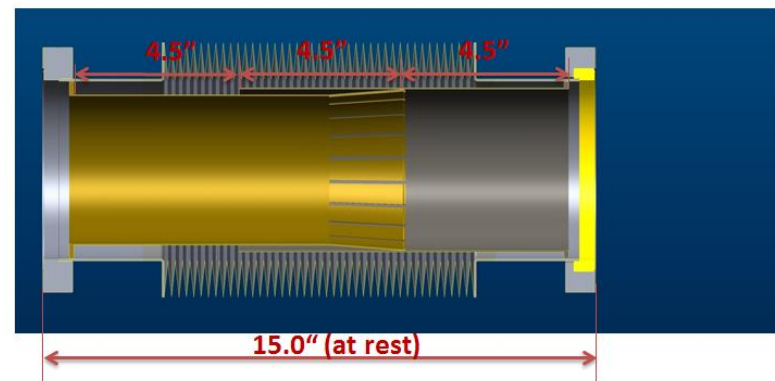
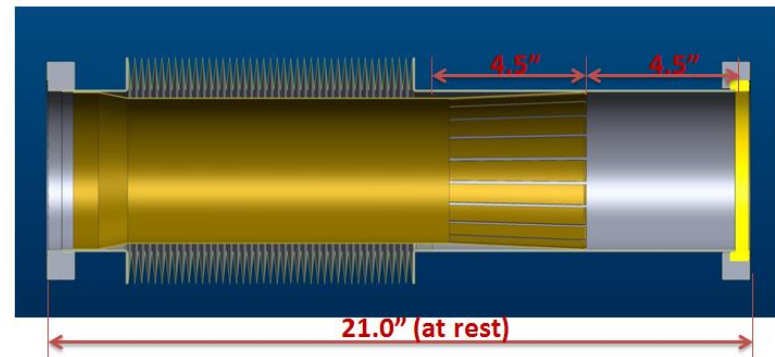
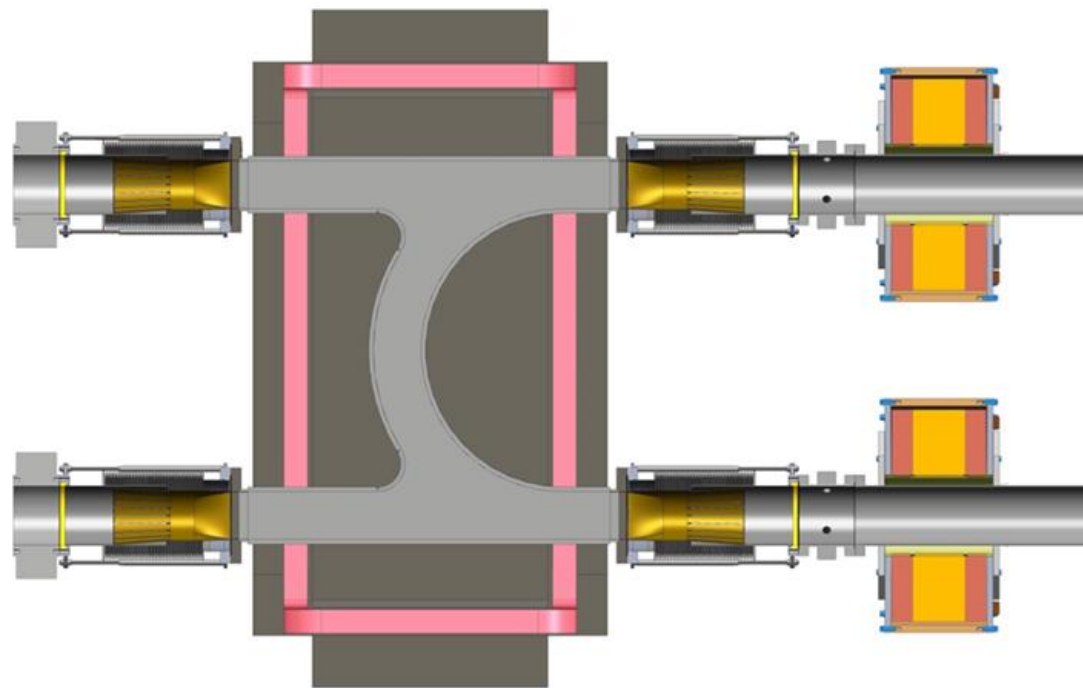


Electron tracking results and field qualities along entire trajectory on $R=2 \text{ cm}$ curved cylinder:

	Ek = 5 MeV	Ek = 1.6 MeV
Total current per coil (Ampere-turn)	2119.146	791.077
Overall current density (A/mm²) (coil-pack cross-section: 5.0 x 6.0 cm)	0.7064	0.2637
Central Field deep inside magnet (Gauss)	525.21	195.78
Effective Magnetic Length (cm)	109.43	109.57
Full b1-integral (dipole) (G-cm)	5.7471E4	2.1452E4
Full b3-integral (6-pole) (G-cm) [Ratio to dipole integral]	0.132 [2.30E-6]	0.005 [2.44E-7]
Full bending angle as shown in tracking studies (required 180°)	180.002°	180.003°



180° Dipole Magnet



Crossing tube aperture (3.94 in. vertical)

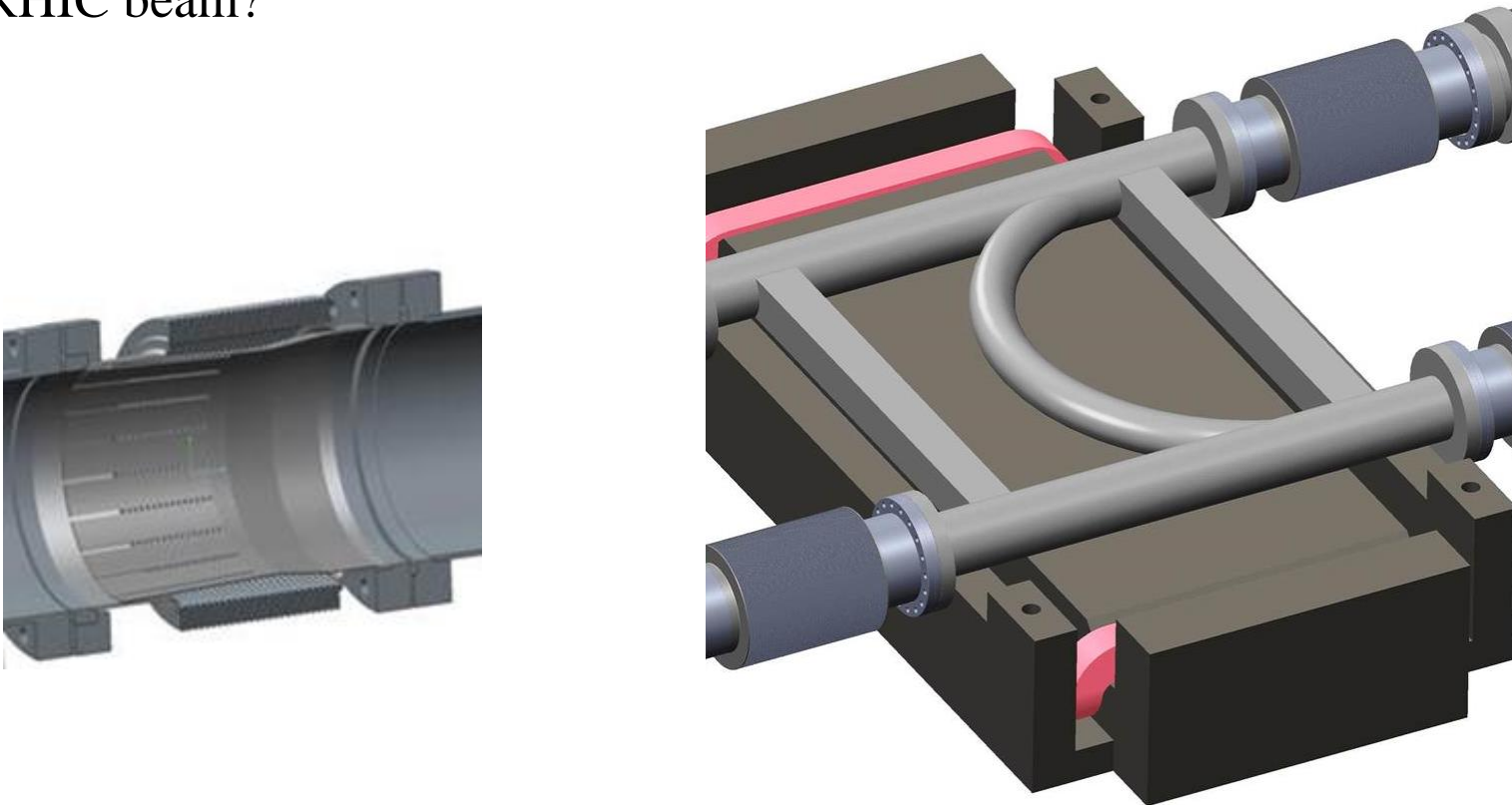
Circular tube?? Vacuum Chamber ID = 9.5 cm (3.75 in.)

Large open 180° vacuum chamber and 20° chamber - beam impedance concerns shield the electron beam path.

Binping Xiao is checking 180° vacuum chamber resonance.

Vacuum Hardware

- Large open 180° vacuum chamber and 20° chamber - beam impedance concerns shield the electron beam path.
- Binping Xiao is checking 180° vacuum chamber resonance.
- Chris Montag is checking aperture – can smaller circular chambers be used for RHIC beam?



Design Room

180° dipole magnet and vacuum chamber integration + large sliding bellows – beam line tuning magnet and vacuum chamber translation (KH)

Design 180o dipole chamber present for impedance review (KH)

Beam Instrumentation Profile Monitor Vacuum Chambers & ferrite insert (GW)

Beam Line 5" bellows with shields (GW)

Phase 2 5 cell cavity positioning (RM)

Phase 1 and 2 cryogenic system layout (RM)

20° dipole fabrication drawings, vacuum chamber (KH)

20° and 180° stand drawings (KH)

Beam line solenoid stand (GW) LF Solenoid, BPM, and long pipe are to be independently positioned and surveyed on common stand.

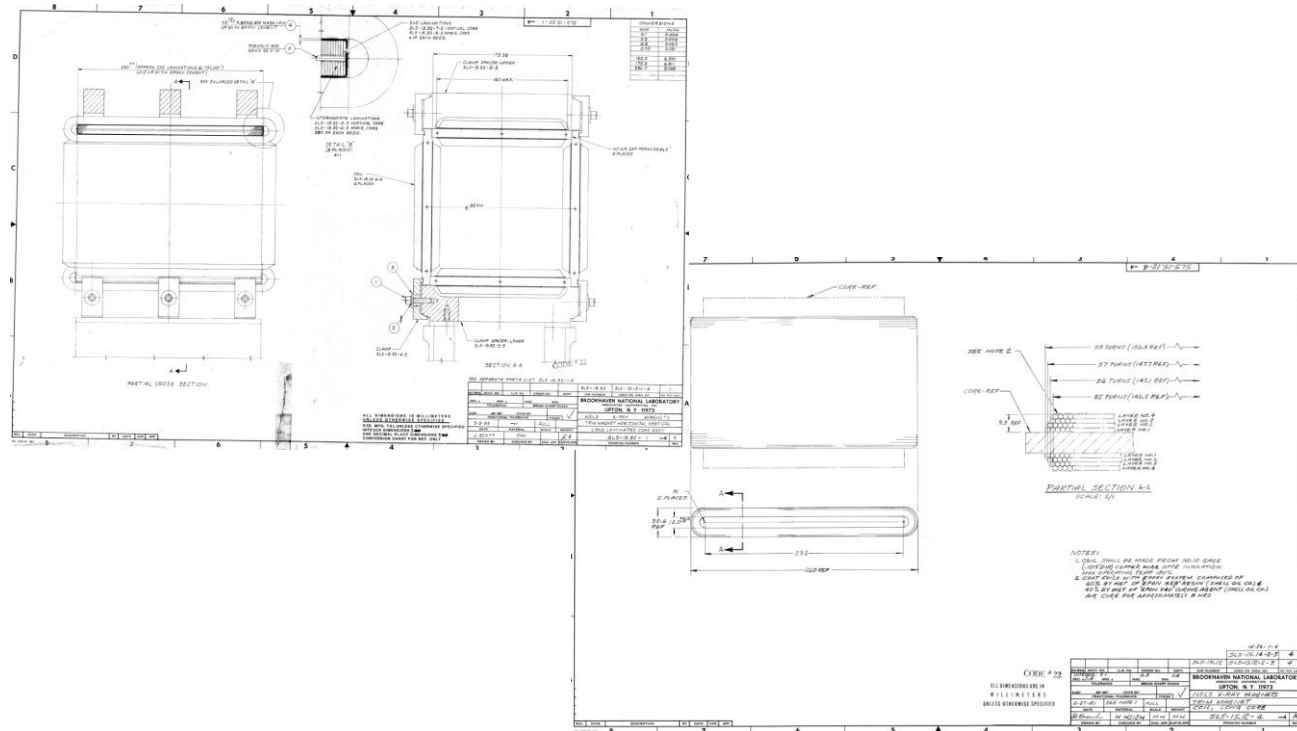
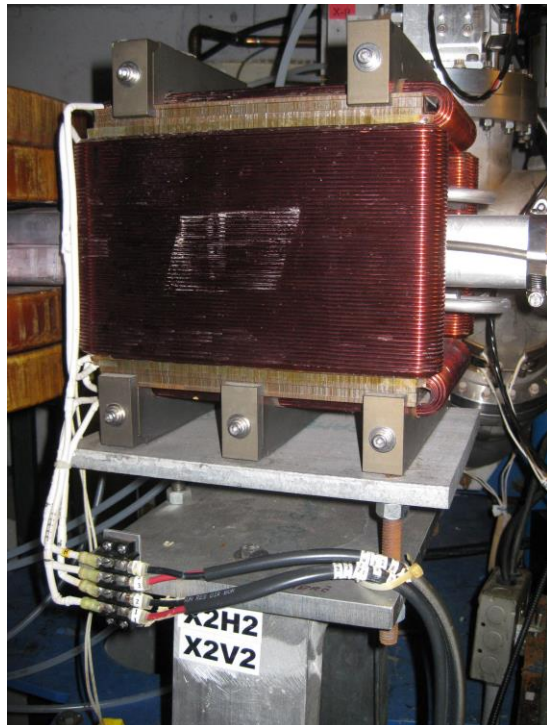
Beam line Beam Position Monitor drawings? (GW or VdM)

Magnetic Shielding drawing and solenoid magnetic measurement test station (GW)

Cable tray and penetration drawings

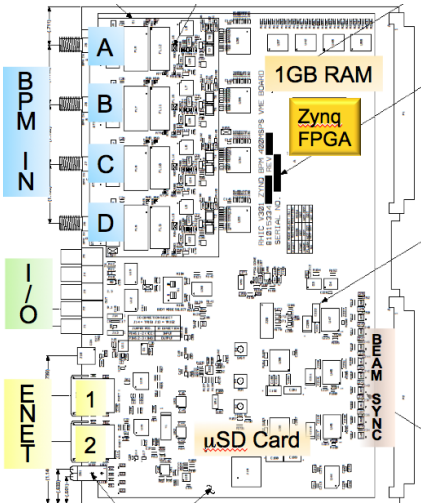
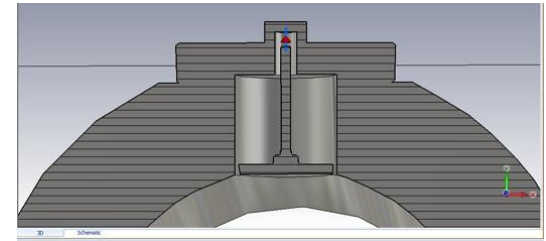
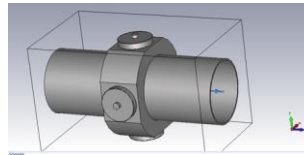
NSLS I Equipment

- Compensating dipole for 20° e beam injection/extraction
- 375 Gcm/A
- In hand!!





- Large Dia. BPM Housings
- 28mm buttons
- N-Type feedthrough
- MPF Q7031-1



BPM board being ordered for CeC
2 boards for testing in LEReC cooling section

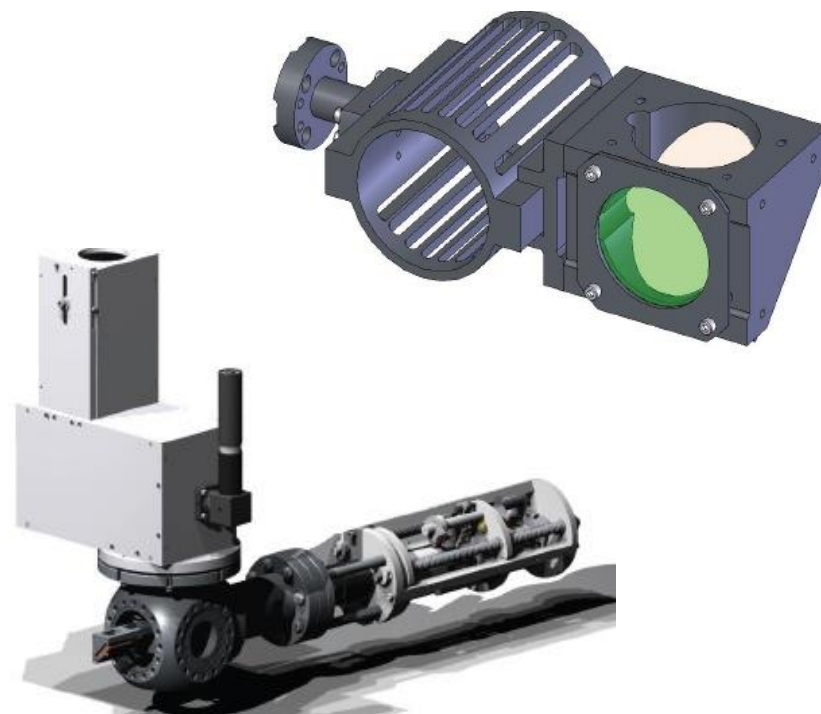
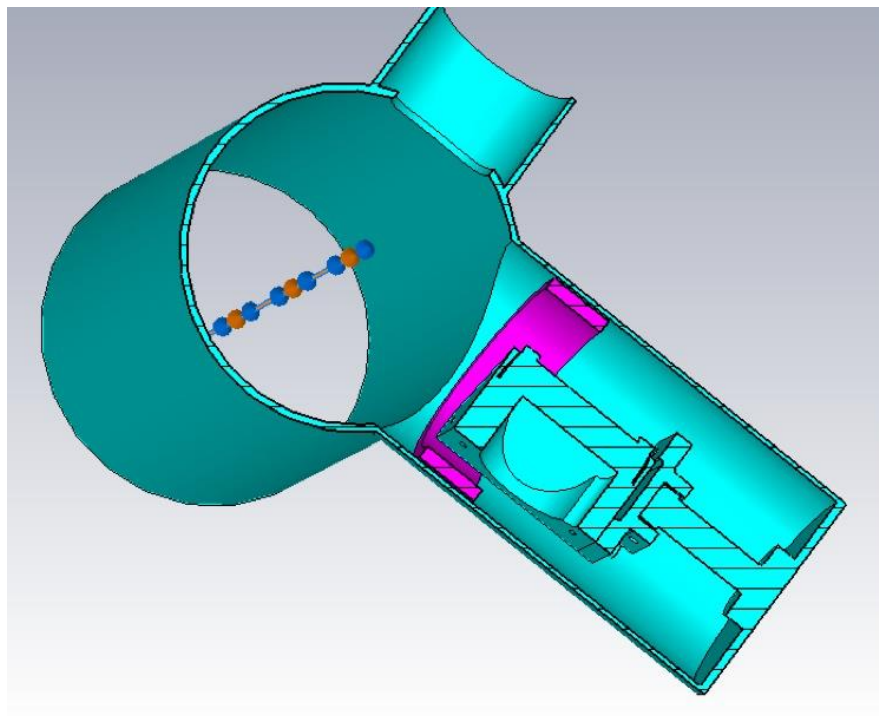
Profile Monitors – New designs for Cooling Section

We will need to install a ferrite ring inside the vacuum chamber in the LEReC profile monitors, as shown below in pink.

CMD5005 material.

The cylinder Peter modeled is 1.65" OD, 1.45" ID and 1" high.

This is a sticking point for procurement as it affects the aperture through which the vendor has to insert the YAG holder.



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